Sept. 24, 1946. O. R. PETERSON ET AL 2,408,268

ADJUSTABLE PUSH GRADER

Filed July 25, 1942 3 Sheets-Sheet 1

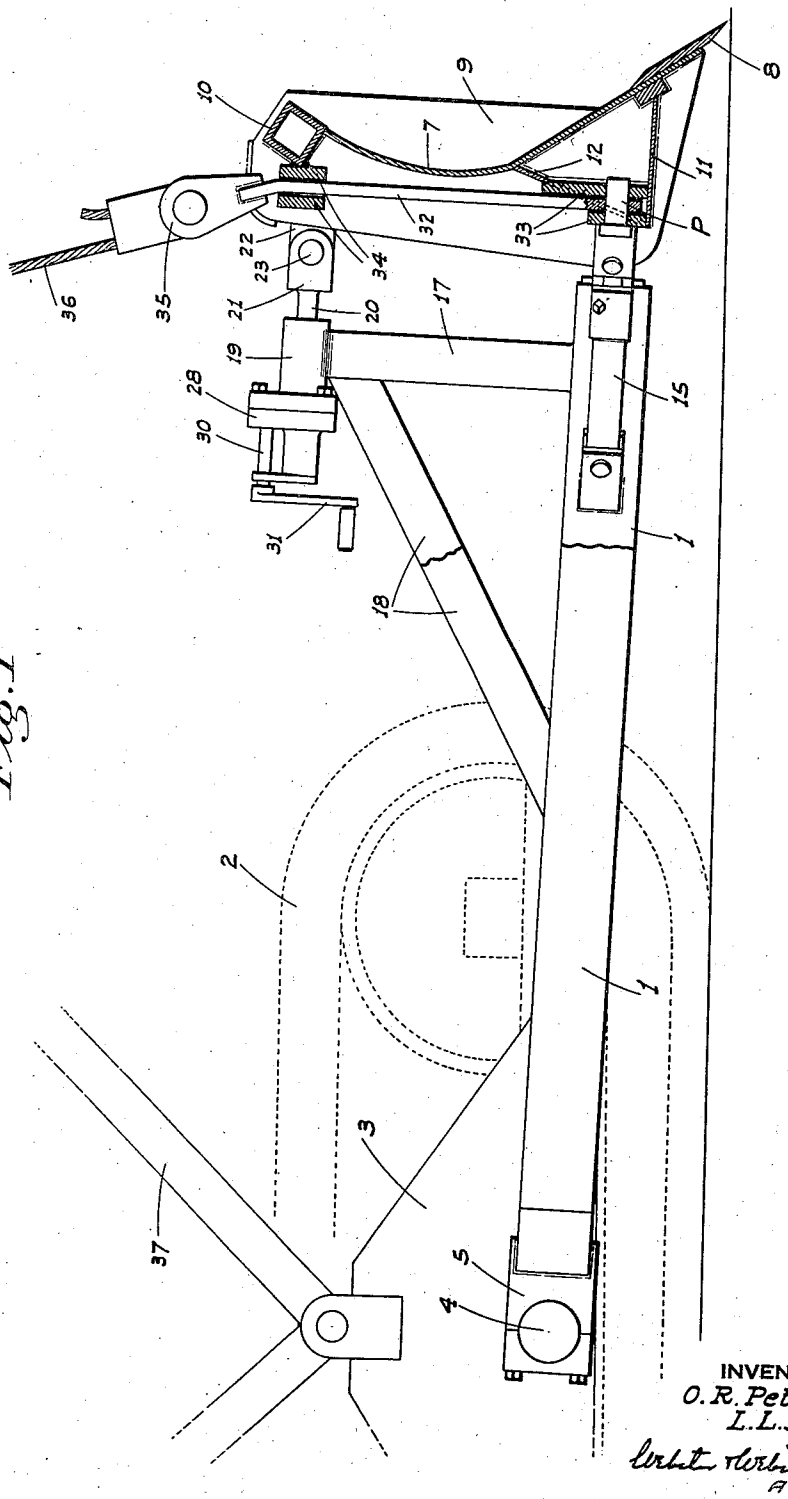

Fig. 1

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Fig. 2

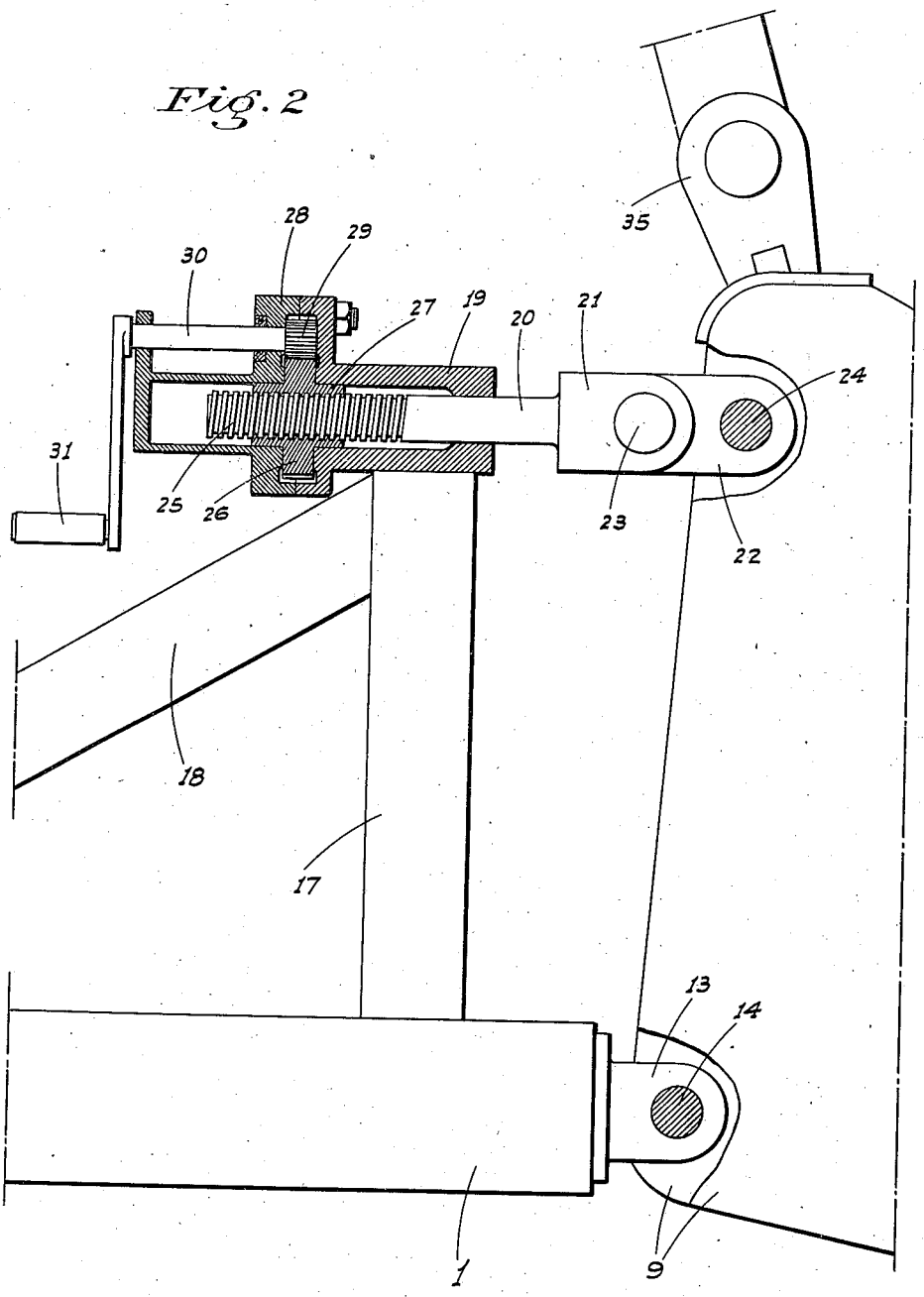

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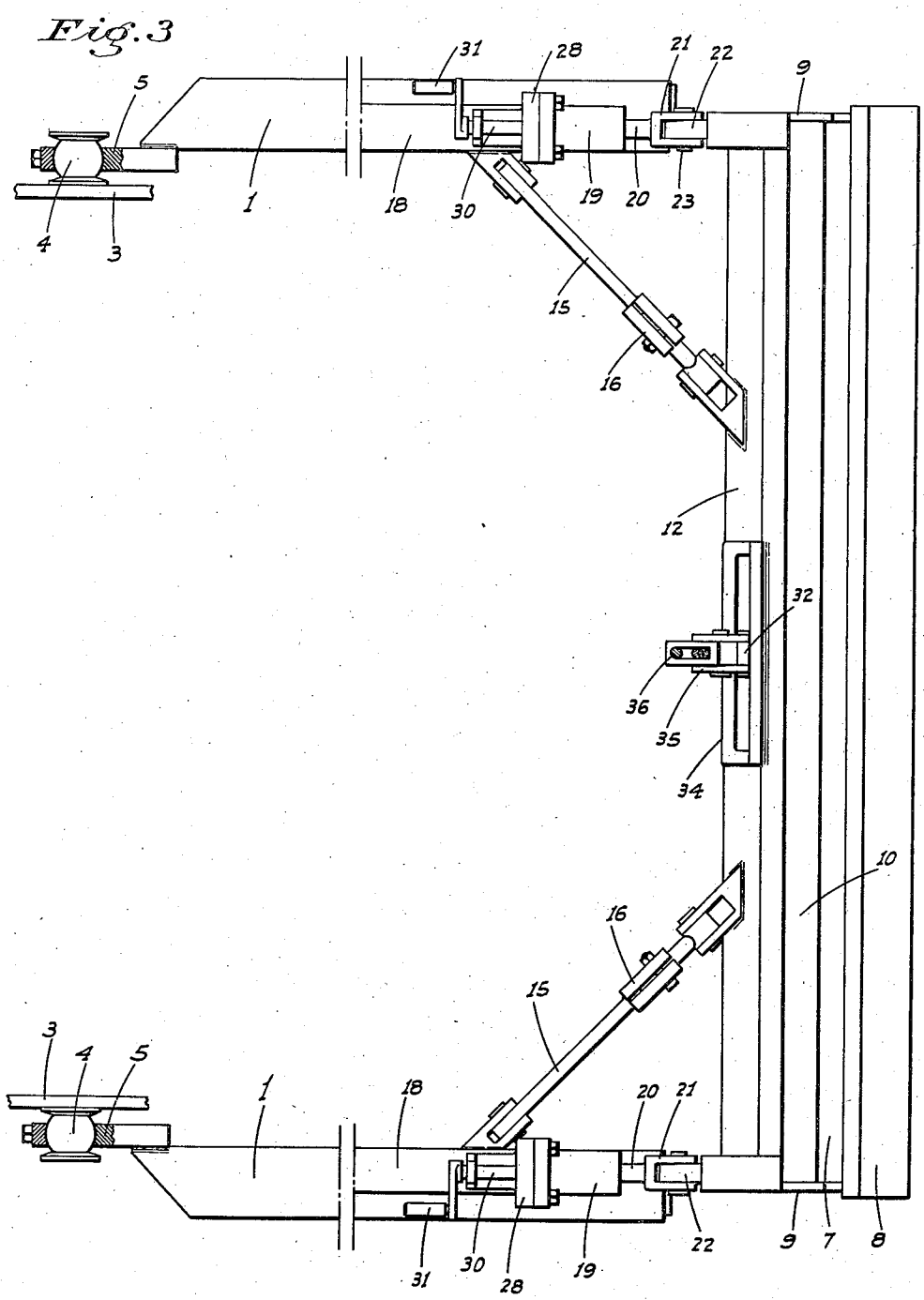
Fig. 3



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ADJUSTABLE PUSH GRADER

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3 Claims. (Cl. 37—144)

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This invention relates to push graders of the type known as "bulldozers," and which comprise in general a transversely extending upstanding grader blade unit mounted in connection with and ahead of a tractor; such a blade unit conventionally being carried by a mount, which permits of vertical adjustment of the working height of the blade unit, as well as tilting adjustment of said unit lengthwise of the tractor.

The principal object of this invention is to provide a push grader having a grader blade unit mount which includes unique means operative to selectively effect tilting of the blade unit lengthwise of the tractor, i. e. forwardly or backwardly; or transversely of the tractor to impart a transverse slope to the blade unit, as is desirable for certain types of work.

Another object of the invention is to provide novel tilt control mechanisms arranged with the grader blade unit mount and designed so that tilting adjustment of the grader blade unit, even from extreme positions, can be accomplished by the tractor operator quickly, easily, and without the use of tools; this feature being of substantial advantage where the implement is used on a job requiring varied and frequent adjustments of the working position of the grader blade unit.

An additional object is to incorporate, with the grader blade unit mount, tilt control mechanisms each of which includes a substantially horizontal, longitudinally extending spindle pivoted to and projecting rearwardly from the grader blade unit adjacent one end, a gear surrounding the spindle and having an axially immovable hub threaded on said spindle, a pinion meshing in driving relation with the gear, and manually controlled means to effect rotation of said pinion; said means including, in one embodiment, a hand crank. In another embodiment said means includes a separate electric motor for and arranged in driving connection with each pinion; operation of the motors being selectively controlled by the operator on the tractor.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects we accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a side elevation, partly in section, of the adjustable push grader as mounted in connection with an endless track tractor.

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Figure 2 is a fragmentary enlarged side elevation of the grader blade unit and its mount; the adjacent tilt control mechanism being shown in section.

Figure 3 is a plan view of the adjustable push grader.

Referring now more particularly to the characters of reference on the drawings, the numeral 1 indicates a pair of forwardly extending transversely spaced push beams disposed on opposite sides and projecting some distance ahead of the tractor, which is indicated generally at 2. At their rear ends the push beams 1 are connected with corresponding upstanding side plates 3 intermediate the ends of the latter by means of universal joints of ball and socket type; said joints comprising ball-like trunnions 4 secured to plates 3, and socket members 5 fixed on the push beams and engaging said trunnions. The side plates 3 are secured in facing relation to the corresponding side frames 6 of the tractor.

A grader blade unit is disposed ahead of the forward ends of the push beams 1 and extends, in upstanding position, transversely therebetween; said grader blade unit comprising a forwardly facing, concave back plate 7 fitted at its lower edge with a transversely extending ground cutting and scraping blade 8. At each end the plate 7 is fitted in rigid relation with a pair of transversely and somewhat spaced plates forming end wings 9 which project both forwardly and rearwardly relative to said back plate 7. The upper edge of back plate 7 is secured to a transverse box beam 10 which extends from side to side of the grader blade unit and is secured at its ends to the end wings 9. The grader blade unit also includes, adjacent its lower edge, a horizontal, transversely extending base plate 11 which projects rearwardly some distance, and another transverse plate 12 extends from the rear edge of plate 11 at an upward and forward incline to connection with plate 7 some distance above plate 11; the plates 11 and 12 serving as reinforcing members.

At their forward ends the push beams 1 are fitted with forwardly projecting ears 13 which extend between the adjacent pairs of end wing plates adjacent the bottom and are secured therebetween by horizontal cross pins 14. Diagonal braces 15 extend between the push beams and the grader blade unit reinforcing plate 12; said braces being pivoted at their ends in connection with said push beams and plate 12 for vertical

swinging movement. The braces 15 each include a compensating connection 16. Vertical posts 17 are mounted in rigid connection with and upstand from the push beams 1 adjacent the forward ends of the latter, and are braced by members 18.

Each post at its upper end is fitted with a horizontal longitudinally extending housing 19 into which a spindle 20 slidably projects from the forward end of said housing. Said spindles ahead of housings 19 are each formed with a clevis 21 whose axis is horizontal. A short link 22 is pivoted in each clevis 21 by a horizontal cross pin 23; the link extending forwardly from the clevis some distance and being engaged between the adjacent end wing plates. A horizontal cross pin 24 secures each of said links 22 between the corresponding wing plates.

Each spindle 20, within its housing 19, is threaded as at 25 and a gear 26 surrounds such threaded portion and includes a hub 27 threaded thereon. Each housing 19 is enlarged as at 28 to form a gear case, such case engaging opposite faces of the gear and preventing axial movement thereof. A drive pinion 29 is disposed in each gear case 28 in mesh with the corresponding gear 26; each pinion including a pinion shaft 30 which projects horizontally and rearwardly from the gear case. Each shaft 30 at its rear end is fitted, in the embodiment of Figs. 1–3, inclusive, with a hand crank 31.

The grader blade unit centrally of its ends and back of plate 7 is fitted with an upstanding elongated link 32 which is pivoted at its lower end by pin P between attachment members 33 for swinging movement in a vertical plane transversely of the implement. The members 33 are suitably mounted in connection with the reinforcing plates 11 and 12.

Adjacent its upper end the link 32 extends through a transverse slot formed by a guide 34 which permits of transverse swinging movement of the link, but maintains the same against rocking movement lengthwise of the tractor. At its upper end and above guide 34 the link is fitted with a pivotally mounted cable anchor 35 to which is attached the lift cable 36. This lift cable extends upwardly over a direction changing sheave (not shown) on a conventional A-frame carried by the tractor; a portion of which A-frame is indicated at 37. The cable 6 is actuated from a conventional power winch on the tractor.

In use of the above described implement, tilting of the grader blade unit lengthwise of the tractor is accomplished easily and quickly by the operator through the medium of the cranks 31, rotation of both of said cranks in the same direction effecting either an advancing or retracting movement of spindles 20, which results in the desired forward or rearward tilt of the grader blade unit.

When it is desired to tilt the grader blade unit transversely of the tractor, one crank is rotated in one direction, and the other crank is rotated in an opposite direction. This results in opposite movement of spindles 20, which produces a tendency to drop one push beam at its rearmost trunnion point and to raise the other beam at said point. Inasmuch as these points are pivotally fixed, this urge is satisfied at the grader blade unit, resulting in lifting of one corner of the same from the ground and transverse angular positioning of said unit.

From the foregoing description it will be readily seen that we have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described our invention, what we claim as new and useful and desire to secure by Letters Patent is:

1. In a push grader, a pair of transversely spaced push beams, a transverse grader blade unit ahead of and pivoted to said push beams for tilting movement lengthwise of the direction of travel, means between the blade unit and push beams to control transverse tilting of said unit, and a blade unit lifting link disposed centrally of the ends of the blade unit and pivoted thereto at the back and adjacent its lower edge for transverse swinging movement, said link extending upward to a point above the blade unit and being adapted at its upper end for connection with a lifting cable.

2. A structure as in claim 1 including a guide member mounted on the blade unit at the back; said member forming an elongated transverse slot through which the link projects.

3. In a push grader, a pair of transversely spaced push beams, a transverse grader blade unit ahead of and pivoted to said push beams for tilting movement lengthwise of the direction of travel, transversely spaced tilt control mechanisms connected between said grader blade unit and corresponding push beams, said mechanisms each being operative to impart a forward, or rearward, tilting force to the grader blade, universal joints on the push beams adjacent their rear ends, one part of said joints being adapted for rigid connection with a tractor, a transversely swingable lifting link pivoted to said blade unit intermediate its ends, and means adapted to connect a lift cable to said link at its upper end.

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